SEQUENCE LISTING

<110> DUKE UNIVERSITY

<120> HUMAN IMMUNODEFICIENCY VIRUS VACCINE

<130> 1579-880

<140> 10/753,339
<141> 2004-01-09

<150> 09/775,805
<151> 2001-02-05

<150> 09/497,497
<151> 2000-02-04

<160> 107

<170> PatentIn Ver. 2.1

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Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met Thr Tyr Lys
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<400> 28
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<213> Homo sapiens

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Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val Arg Met Tyr
1 5 10 15

Ser Lys Ile Arg Leu Arg Pro Gly Gly Lys
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<213> Homo sapiens

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Ser Ser Leu Tyr Asn Thr Val Ala Thr Leu
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Gln Ile Ile Asn Met Trp Gln Glu Val Gly Lys Ala Met Tyr Ala Ser
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Leu Tyr Asn Ala Val Ala Thr Leu

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Leu Tyr Asn Thr Val Ala Val Leu
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Leu Phe Asn Leu Leu Ala Val Leu
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<400> 39
Lys Gln Ile Ile Asn Met Trp Gln Val Val Gly Lys Ala Met Tyr Ala
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Gly Gln Met Val His Gln Ala Ile Ser Pro Arg Thr Leu Asn Ala Trp
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Val Lys Val Val
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Ala Thr Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val Gly Gly His
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Glu Trp
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Gly Pro Lys Glu Pro Phe Arg Asp Tyr Val Asp Arg Phe Tyr Lys Thr
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Leu Arg Ala Glu Gln Ala Ser Gln Glu Val Lys Asn Trp Met Thr
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<213> Homo sapiens

<400> 42
Lys Gln Ile Ile Asn Met Trp Gln Val Val Gly Lys Ala Met Tyr Ala
1 5 10 15

Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys Lys Tyr Lys Leu Lys His
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Ile Val Trp Gly Ser Glu Glu Leu Arg Ser Leu Tyr Asn Thr Val Ala
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Thr Leu Tyr Cys Val His Gln Arg Ile
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<213> Murine sp.

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His Ala Gly Pro Ile Ala Pro Gly Gln Met Arg Glu Pro Arg Gly
1 5 10 15

<210> 44
<211> 16
<212> PRT
<213> Murine sp.

<400> 44
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<213> Murine sp.

<400> 45
Lys Glu Lys Val Tyr Leu Ala Trp Val Pro Ala His Lys Gly Ile Gly
1 5 10 15

<210> 46
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<400> 46
Met Tyr Ala Pro Pro Ile Gly Gly Gln Ile
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<210> 47
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<213> Murine sp.

<400> 47
Gln Leu Leu Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg
1 5 10 15

<210> 48
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<213> Murine sp.

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<210> 49
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<213> Murine sp.

<400> 49
Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp Gln Ser Leu
1 5 10 15

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<400> 50
Arg Ile His Ile Gly Pro Gly Arg Ala Phe Tyr Thr Thr Lys Asn
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<210> 51
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<213> Macaque sp.

<400> 51
Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly Val Ala
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Pro Thr Lys Ala
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<400> 52
Cys Thr Pro Tyr Asp Ile Asn Gln Met
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<210> 53
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<212> PRT
<213> Macaque sp.

<400> 53
Val Ser Thr Val Gln Cys Thr His Gly Ile Arg Pro Val Val Ser Thr
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Gln Leu Leu Leu
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Ser Thr Pro Pro Leu Val Arg Leu
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<213> Macaque sp.

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Lys Leu Asp Ile
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<400> 56
Tyr Ala Pro Pro Ile Ser Gly Gln Ile
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<210> 57
<211> 20
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<213> Macaque sp.

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Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly Val Ala
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Pro Thr Lys Ala
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<400> 58
Cys Thr Pro Tyr Asp Ile Asn Gln Met Leu
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<213> Macaque sp.

<400> 59
Val Ser Thr Val Gln Cys Thr His Gly Ile Arg Pro Val Val Ser Thr
1 5 10 15

Gln Leu Leu Leu
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<400> 60
Cys Thr Pro Tyr Asp Tyr Asn Gln Met Leu
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<210> 61
<211> 20
<212> PRT
<213> Macaque sp.

<400> 61
Ser Thr Ser Ile Arg Gly Lys Val Gln Lys Glu Tyr Ala Phe Phe Tyr
1 5 10 15

Lys Leu Asp Ile
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<210> 62
<211> 10
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<213> Macaque sp.

<400> 62
Cys Thr Pro Tyr Asp Ala Asn Gln Met Leu
1 5 10

<210> 63
<211> 20
<212> PRT
<213> Macaque sp.

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Glu Tyr Ala Phe Phe Tyr Lys Leu Asp Ile Ile Pro Ile Asp Asn Asp
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Thr Thr Ser Tyr
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<210> 64
<211> 10
<212> PRT
<213> Macaque sp.

<400> 64
Cys Thr Pro Tyr Asp Asp Asn Gln Met Leu
1 5 10

<210> 65
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<212> PRT
<213> Macaque sp.

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Arg Glu Gln Phe Gly Asn Asn Lys Thr Ile Ile Phe Lys Gln Ser Ser
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Gly Gly Asp Pro Glu
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<210> 66
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<213> Macaque sp.

<400> 66
Cys Thr Pro Tyr Asp Lys Asn Gln Met Leu
1 5 10

<210> 67
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<213> Homo sapiens

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Lys Gln Ile Ile Asn Met Trp Gln Glu Val Gly Lys Ala Met Tyr Ala
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<210> 68
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Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe
1 5 10

<210> 69
<211> 17
<212> PRT
<213> Homo sapiens

<400> 69
Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val Arg Met Tyr
1 5 10 15

Ser

<210> 70
<211> 30
<212> PRT

<213> Homo sapiens

<400> 70
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Gly Leu Asn Lys Ile Val Arg Met Tyr Ser Pro Thr Ser Ile
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<210> 71
<211> 15
<212> PRT
<213> Homo sapiens

<400> 71
Asp Arg Val Ile Glu Val Val Gln Gly Ala Tyr Arg Ala Ile Arg
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<210> 72
<211> 17
<212> PRT
<213> Homo sapiens

<400> 72
Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met Thr Tyr
1 5 10 15

Lys

<210> 73
<211> 15
<212> PRT
<213> Homo sapiens

<400> 73
Ala Ser Leu Trp Asn Trp Phe Asn Ile Thr Asn Trp Leu Trp Tyr
1 5 10 15

<210> 74
<211> 17
<212> PRT
<213> Homo sapiens

<400> 74
Trp Val Tyr His Thr Gln Gly Phe Phe Pro Asp Trp Gln Asn Tyr Thr
1 5 10 15

Pro

<210> 75
<211> 16
<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: HIV-1
Th-dominant/subdominant CTL epitopes in MVA.

<400> 75
Lys Gln Ile Ile Asn Met Trp Gln Glu Val Gly Lys Ala Met Tyr Ala
1 5 10 15

<210> 76
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: HIV-1
Th-dominant/subdominant CTL epitopes in MVA.

<400> 76
Ser Leu Tyr Asn Thr Val Ala Thr Leu
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<210> 77
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: HIV-1
Th-dominant/subdominant CTL epitopes in MVA.

<400> 77
Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val Arg Met Tyr
1 5 10 15

Ser

<210> 78
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: HIV-1
Th-dominant/subdominant CTL epitopes in MVA.

<400> 78
Lys Ile Arg Leu Arg Pro Gly Gly Lys
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<210> 79
<211> 15

<212> PRT
<213> Artificial Sequence

<220>
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Th-dominant/subdominant CTL epitopes in MVA.

<400> 79
Asp Arg Val Ile Glu Val Val Gln Gly Ala Tyr Arg Ala Ile Arg
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<210> 80
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<212> PRT
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<220>
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Th-dominant/subdominant CTL epitopes in MVA.

<400> 80
Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys
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<220>
<223> Description of Artificial Sequence: HIV-1
Th-dominant/subdominant CTL epitopes in MVA.

<400> 81
Ala Ser Leu Trp Asn Trp Phe Asn Ile Thr Asn Trp Leu Trp Tyr
1 5 10 15

<210> 82
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: HIV-1
Th-dominant/subdominant CTL epitopes in MVA.

<400> 82
Gly Gly Lys Lys Lys Tyr Lys Leu
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<210> 83
<211> 15
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<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: HIV-1
Th-dominant/subdominant CTL epitopes in MVA.

<400> 83
Met Arg Glu Pro Arg Gly Ser Lys Ile Ala Gly Thr Thr Ser Thr
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<210> 84
<211> 9
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<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: HIV-1
Th-dominant/subdominant CTL epitopes in MVA.

<400> 84
Glu Arg Tyr Leu Lys Asp Gln Gln Leu
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<210> 85
<211> 17
<212> PRT
<213> Artificial Sequence

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<223> Description of Artificial Sequence: HIV-1 Th-CTL
A2 p17 epitope (A2 Variants) in MVA

<400> 85
Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val Arg Met Tyr
1 5 10 15

Ser

<210> 86
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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A2 p17 epitope (A2 Variants) in MVA

<400> 86
Ser Leu Tyr Asn Thr Val Ala Thr Leu
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<210> 87
<211> 15

<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: HIV-1 Th-CTL
A2 p17 epitope (A2 Variants) in MVA

<400> 87
Asp Arg Val Ile Glu Val Val Gln Gly Ala Tyr Arg Ala Ile Arg
1 5 10 15

<210> 88
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: HIV-1 Th-CTL
A2 p17 epitope (A2 Variants) in MVA

<400> 88
Ser Leu Phe Asn Thr Val Ala Thr Leu
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<210> 89
<211> 16
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<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: HIV-1 Th-CTL
A2 p17 epitope (A2 Variants) in MVA

<400> 89
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1 5 10 15

<210> 90
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: HIV-1 Th-CTL
A2 p17 epitope (A2 Variants) in MVA

<400> 90
Ser Leu Tyr Asn Ala Val Ala Thr Leu
1 5

<210> 91
<211> 15
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<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: HIV-1 Th-CTL
A2 p17 epitope (A2 Variants) in MVA

<400> 91
Ala Ser Leu Trp Asn Trp Phe Asn Ile Thr Asn Trp Leu Trp Tyr
1 5 10 15

<210> 92
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: HIV-1 Th-CTL
A2 p17 epitope (A2 Variants) in MVA

<400> 92
Ser Leu Tyr Asn Thr Val Ala Val Leu
1 5

<210> 93
<211> 15
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<220>
<223> Description of Artificial Sequence: HIV-1 Th-CTL
A2 p17 epitope (A2 Variants) in MVA

<400> 93
Met Arg Glu Pro Arg Gly Ser Lys Ile Ala Gly Thr Thr Ser Thr
1 5 10 15

<210> 94
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: HIV-1 Th-CTL
A2 p17 epitope (A2 Variants) in MVA

<400> 94
Ser Leu Phe Asn Leu Leu Ala Val Leu
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<210> 95
<211> 39
<212> PRT
<213> Human immunodeficiency virus

<400> 95
Lys Gln Ile Ile Asn Met Trp Gln Glu Val Gly Lys Ala Met Tyr Ala
1 5 10 15

Thr Arg Pro Asn Tyr Asn Lys Arg Lys Arg Ile His Ile Gly Pro Gly
20 25 30

Arg Ala Phe Tyr Thr Thr Lys
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<210> 96
<211> 39
<212> PRT
<213> Human immunodeficiency virus

<400> 96
Lys Gln Ile Ile Asn Met Trp Gln Glu Val Gly Lys Ala Met Tyr Ala
1 5 10 15

Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile Thr Lys Gly Pro Gly
20 25 30

Arg Val Ile Tyr Ala Thr Gly
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<210> 97
<211> 39
<212> PRT
<213> Human immunodeficiency virus

<400> 97
Lys Gln Ile Ile Asn Met Trp Gln Glu Val Gly Lys Ala Met Tyr Ala
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Thr Arg Pro Gly Asn Asn Thr Arg Lys Ser Ile Pro Ile Gly Pro Gly
20 25 30

Arg Ala Phe Ile Ala Thr Ser
35

<210> 98
<211> 39
<212> PRT
<213> Human immunodeficiency virus

<400> 98
Lys Gln Ile Ile Asn Met Trp Gln Glu Val Gly Lys Ala Met Tyr Ala
1 5 10 15

Thr Arg Pro His Asn Asn Thr Arg Lys Ser Ile His Met Gly Pro Gly
20 25 30

Lys Ala Phe Tyr Thr Thr Gly

35

<210> 99
<211> 39
<212> PRT
<213> Human immunodeficiency virus

<400> 99
Lys Gln Ile Ile Asn Met Trp Gln Gly Val Gly Lys Ala Met Tyr Ala
1 5 10 15

Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile Thr Lys Gly Pro Gly
20 25 30

Arg Val Ile Tyr Ala Thr Gly
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<210> 100
<211> 39
<212> PRT
<213> Human immunodeficiency virus

<400> 100
Lys Gln Ile Ile Asn Met Trp Gln Val Val Gly Lys Ala Met Tyr Ala
1 5 10 15

Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile Thr Lys Gly Pro Gly
20 25 30

Arg Val Ile Tyr Ala Thr Gly
35

<210> 101
<211> 39
<212> PRT
<213> Human immunodeficiency virus

<400> 101
Lys Gln Ile Ile Asn Met Trp Gln Glu Val Gly Glu Ala Met Tyr Ala
1 5 10 15

Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile Thr Lys Gly Pro Gly
20 25 30

Arg Val Ile Tyr Ala Thr Gly
35

<210> 102
<211> 27
<212> PRT
<213> Homo sapiens

<400> 102

```
Lys Gln Ile Ile Asn Met Trp Gln Glu Val Gly Lys Ala Met Tyr Ala
  1               5                  10                  15

Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe
             20                  25
```

<210> 103
<211> 47
<212> PRT
<213> Homo sapiens

<400> 103

```
Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val Arg Met Tyr
  1               5                  10                  15

Ser Asn Pro Pro Ile Pro Val Gly Glu Ile Tyr Lys Arg Trp Ile Ile
             20                  25                  30

Leu Gly Leu Asn Lys Ile Val Arg Met Tyr Ser Pro Thr Ser Ile
         35                  40                  45
```

<210> 104
<211> 36
<212> PRT
<213> Homo sapiens

<400> 104

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Lys Gln Ile Ile Asn Met Trp Gln Val Val Gly Lys Ala Met Tyr Ala
  1               5                  10                  15

Gly Gln Met Val His Gln Ala Ile Ser Pro Arg Thr Leu Asn Ala Trp
             20                  25                  30

Val Lys Val Val
         35
```

<210> 105
<211> 50
<212> PRT
<213> Homo sapiens

<400> 105

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Lys Gln Ile Ile Asn Met Trp Gln Val Val Gly Lys Ala Met Tyr Ala
  1               5                  10                  15

Ala Thr Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val Gly Gly His
             20                  25                  30

Gln Ala Ala Met Gln Met Leu Lys Glu Thr Ile Asn Glu Glu Ala Ala
         35                  40                  45

Glu Trp
     50
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<210> 106
<211> 47
<212> PRT
<213> Homo sapiens

<400> 106
Lys Gln Ile Ile Asn Met Trp Gln Val Val Gly Lys Ala Met Tyr Ala
1 5 10 15

Gly Pro Lys Glu Pro Phe Arg Asp Tyr Val Asp Arg Phe Tyr Lys Thr
20 25 30

Leu Arg Ala Glu Gln Ala Ser Gln Glu Val Lys Asn Trp Met Thr
35 40 45

<210> 107
<211> 57
<212> PRT
<213> Homo sapiens

<400> 107
Lys Gln Ile Ile Asn Met Trp Gln Val Val Gly Lys Ala Met Tyr Ala
1 5 10 15

Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys Lys Tyr Lys Leu Lys His
20 25 30

Ile Val Trp Gly Ser Glu Glu Leu Arg Ser Leu Tyr Asn Thr Val Ala
35 40 45

Thr Leu Tyr Cys Val His Gln Arg Ile
50 55